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JADWIN DAM CONDITION REPORT, DAM, OUTLET WORKS & SPILLWAY PERIO--ETC(U)
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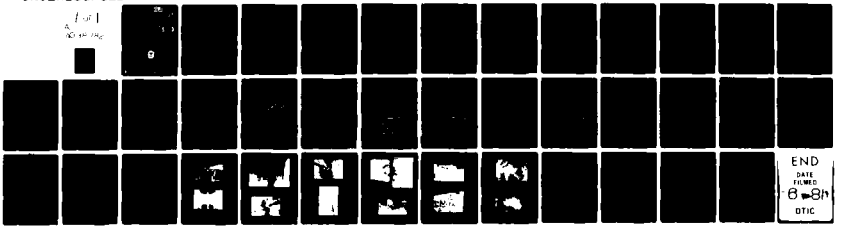

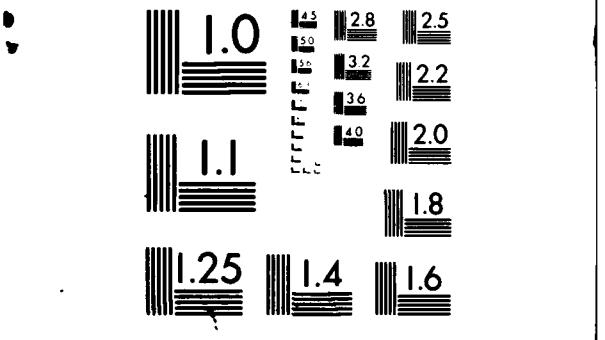

LACKAWAXEN RIVER BASIN

DYBERRY CREEK, PENNSYLVANIA

JADWIN DAM

CONDITION REPORT

DAM, OUTLET WORKS & SPILLWAY

PERIODIC INSPECTION REPORT NO. 4

NOVEMBER 1980

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE - 2D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

APRIL 1981

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: DAEN/NAP-06460/PIR04-81/04
2. GOVT ACCESSION NO.:
3. RECIPIENT'S CATALOG NUMBER:
4. TITLE (and Subtitle): J[redacted] Dam condition report, dam, outlet works & spillway periodic inspection report [redacted]
[redacted]
5. TYPE OF REPORT & PERIOD COVERED: Periodic inspection report 1976-80
6. PERFORMING ORG. REPORT NUMBER: DAEN/NAP-06460/PIR04-81/04
7. AUTHOR(s):
8. CONTRACT OR GRANT NUMBER(s):
9. PERFORMING ORGANIZATION NAME AND ADDRESS:
U.S. Army Engineer District, Philadelphia
2nd & Chestnut Sts.
Philadelphia, PA 19106
10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS:
11. CONTROLLING OFFICE NAME AND ADDRESS:
12. REPORT DATE: Nov[redacted]80
13. NUMBER OF PAGES: 25 p.
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APPROVED FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report):
18. SUPPLEMENTARY NOTES:
19. KEY WORDS (Continue on reverse side if necessary and identify by block number):

Jadwin Dam, Pa.
Lackawaxen River Basin
Dyberry Creek, Pa.
Structural analysis
Site inspection
Outlet works
Spillways
Piezometer data
Embankments

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This inspection report presented the results of the fourth periodic inspection, instrumentation readings and remedial measures adopted by the Philadelphia District Corps of Engineers on Jadwin Dam, Pa. located on Dyberry Creek. No major areas of concern were noted by the inspection team. Instrumentation installed to date was found to be currently operational and adequate to measure performance of the dam. It was recommended that piezometeric and visual data be obtained during periods of high water.

INSPECTION AND ACTION SUMMARY
Periodic Inspection Report No. 4

Item	Summary of Comment(s)	Action
1. Outlet Works Intake Structure.	Concrete badly weathered and pitted at base of intake center pier nose and at transverse construction joint at end of the transition zone. (Periodic Inspection No. 3)	Crack and condition survey prepared subsequent to the second periodic inspection.
	Concern expressed concerning jamming of uncontrolled intake structure by debris. (Periodic Inspection No. 3)	Alternate plans of control are under study. Current method consists of periodically cleaning debris from trash racks using crane.
2. Tunnel.	Stoplogs did not reduce flow through the tunnel enough to allow safe entry with stream level approximately 1' above normal level. (Periodic Inspection No. 3) Stoplog installation procedure judged inadequate. (Periodic Inspection No. 4) Deep spalling noted at Sta. 16+95 at the intersection of the horizontal and vertical construction joints. (Periodic Inspection No. 4)	Corrective measures will be developed. Ladder will be proved for access and egress when placing stoplogs. Spalls to be patched during summer of 1981.
3. Stilling Basin.	Cracks noted on side and wingwalls of the stilling basin. Cracking of left side walls is most evident.	Recommend sealing of cracks in summer of 1981 to reduce further deterioration.

INSPECTION AND ACTION SUMMARY
Periodic Inspection Report No. 4 (Continued)

Item	Summar of Comment(s)	Action
4. Embankment.	Provide for visits by Foundations and Materials Section personnel during high pool stated. (Periodic Inspection No. 3)	Addition to O&M Manual.
	Seepage noted at upstream toe, approximately 40 ft. from right abutment. (Periodic Inspection No. 4)	No action required.
	Settlement in fill around piezometer DYB-38 noted. (Periodic Inspection No. 4)	Backfill around piezometer to elevation of surrounding embankment.
	Several settlement holes noted downstream of the toe of the downstream berm. These holes are believed to have been present since the old creek channel was backfilled during construction. (Periodic Inspection No. 4)	Recommend continued surveillance of this area, particularly during periods of above normal pool elevations.
5. Spillway.	Cracks noted on top of ogee weir. (Periodic Inspection No. 4)	Recommend sealing in summer of 1981.
	Minor rockfalls noted on both sides of spillway. (Periodic Inspection No. 4)	No action required.
	Numerous open joints noted in rock on righthand side of spillway cut. (Periodic Inspections 3 and 4)	Continued observation recommended.

INSPECTION AND ACTION SUMMARY
Periodic Inspection Report No. 4 (Continued)

Item	Summary of Comment(s)	Action
5. Spillway (Continued).	Large wet area noted at the downstream end of the spillway, almost in line with the jointed section of the spillway wall. (Periodic Inspection No. 4)	Continued observation recommended.
	Ponding in area upstream of spillway weir noted. (Periodic Inspection No. 4)	No action required.
6. Reservoir Area.	Intakes to gaging tower restricted by sediment and vegetation. (Periodic Inspection No. 4)	Clean sediment out of lowest intake screen and cut vegetation around two lowest intakes periodically (at least once a month during growing season)

CONDITION REPORT
JADWIN DAM
DYBERRY CREEK, PENNSYLVANIA
DAM, OUTLET WORKS AND SPILLWAY
PERIODIC INSPECTION REPORT NO. 3

TABLE OF CONTENTS

Plates

No.	Title
1	Instrumentation Plan
2	Piezometer Data 1973-1974
3	Piezometer Data 1975-1976
4	Piezometer Data 1977-1978
5	Piezometer Data 1979-1980

Appendix A

List of Attendees - Periodic Inspection No. 4

Appendix B

Photographs

Appendix C

NADEN-TF&TS Report of Periodic Inspection No. 4, Jadwin Dam dated 19 December 1980

JADWIN DAM
DYBERRY CREEK, PENNSYLVANIA
DAM, OUTLET WORKS AND SPILLWAY
PERIODIC INSPECTION REPORT NO. 4

SECTION 1
INTRODUCTION

1-01. AUTHORITY AND SCOPE. This report has been prepared in accordance with Engineering Regulation 1110-2-100 entitled "Periodic Inspection and Continuing Evaluation of Completed Civil Works Structures".

This report presents the results of the fourth periodic inspection, instrumentation readings obtained since the third periodic inspection, and presents remedial measures adopted by the District.

As-built drawings showing significant project features are included in the second periodic inspection report and in Appendix C of the third periodic inspection report for Jadwin Dam.

1-02. CONSTRUCTION HISTORY. The construction history of the dam site facilities was presented in Periodic Inspection Report No. 2.

1-03. INSPECTION AND EVALUATION. As required by ER 1110-2-100 "Periodic Inspection and Continuing Evaluation of Completed Civil Works Structures," a system of continuing evaluation including periodic inspection was planned to assure the safety and stability of the Jadwin Dam Project. These periodic inspections are planned to detect problem areas and to provide a basis for recommendations of remedial treatment if and when required. Periodic inspections for Jadwin Dam have been performed or are tentatively scheduled in the following sequence:

Inspection	Time Interval	Scheduled Date	Actual Date
Initial		June 1966	7-9 Jun 1966
2nd Periodic	5 years	July 1971	21 Jul 1971
3rd Periodic	5 years	July 1976	8-9 Nov 1976
4th Periodic	5 years	July 1981	13 Nov 1980
5th Periodic	5 years	July 1986	

1-04. POOL EXPERIENCE TO DATE.

Since completion in 1959, the following maximum annual pool elevations were recorded:

DATE OF ANNUAL MAXIMUM POOL ELEVATIONS	ANNUAL MAXIMUM POOL ELEVATIONS
5 Apr 60	1004.9
26 Feb 61	999.4
1 Apr 62	1009.0
28 Mar 63	1003.1
11 Mar 64	1005.9
9 Feb 65	986.9
10 Jun 66	987.8
30 Mar 67	992.1
31 May 68	991.3
25 Mar 69	989.5
3 Apr 70	995.8
14 Feb 71	999.5
24 Jun 72	994.8
29 Jun 73	1017.4
9 Dec 74	991.5
25 Feb 75	1015.5
27 Jan 76	998.0
14 Mar 77	1006.2
28 Mar 78	997.6
6 Mar 79	994.0
22 Mar 80	1002.7

SECTION 2
FOURTH PERIODIC INSPECTION

2-01. GENERAL. The fourth periodic inspection was held on 13 November 1980 and was attended by representatives of North Atlantic Division and Philadelphia District. The list of those attending is included in Appendix A.

Under normal flow conditions in Dyberry Creek, Jadwin Dam functions as a "dry dam" with no appreciable accumulation of water upstream. The outlet works is ungated. During high water and flooding conditions, water is impounded behind the dam and release rates through the outlet works are dependent upon the height of the pool. The maximum discharge capacity of the outlet is 2450 cubic feet per second when the pool is at elevation 1053 feet (S.L.D.).

Upon arrival at the Prompton Project Office, the inspection party was briefed on the results of the previous periodic inspections. Copies of the previous periodic inspection reports were available for use by the inspection team members. A review of the instrumentation data collected since the last inspection was made prior to beginning the inspection and a detailed check list was supplied for use during the inspections. The party proceeded to the project site and inspected the tunnel, intake structure, stilling basin, embankment, spillway, the downstream area and the upstream reservoir area.

Following the inspection, a critique was conducted in the Prompton Project Office based upon the check list which had been furnished. Comments made at the critique are summarized in the following subsections 1-02 through 2-08.

2-02. INTAKE TOWER.

a. Minor leakage around stoplogs noted, particularly between lower stoplogs and sill. No action required.

b. Stoplog installation procedure judged inadequate due to demands placed on person(s) placing plastic in front of each stoplog to prevent excessive leakage and detaching or attaching lifting cables. The minimum requirement to render the operation marginally satisfactory is to provide a ladder for access to and egress from the invert level of the intake tower. Recommend development of safer, more efficient method of placing and removing stoplogs as soon as possible.

c. No change noted in concrete surfaces or cracking since the previous inspection.

2-03. TUNNEL.

a. A few spalls in the vicinity of Station 16+95 and at the transition section were larger and deeper than noted during the 1978 inspection. This spalling is noted at the intersections of horizontal and vertical construction joints. Recommend patching of these spalls.

b. No changes in concrete cracking, leakage or joint condition since the 1978 inspection were noted. No action required.

2-04. STILLING BASIN.

a. No change in crazing cracking since the last periodic inspection was noted. No action required.

b. Cracks in downstream monoliths, both side and wing walls, noted. Recommend sealing of cracks.

c. One baffle block (blocks visible approximately 2 ft. below water surface) appeared slightly damaged. No action required.

2-05. EMBANKMENT.

a. Seepage noted at upstream toe approximately 40 ft. from right abutment. It appears to be surface and possibly ground water trapped in the riprap by the uncompacted fill section and poses no problem. No action required.

b. Several holes were noted in the area from 100 to 200 feet downstream of the seepage berm in the rock backfilled section of the old creek channel. Another was noted at the tow of the seepage berm. These holes are believed to have been present in the backfill since its placement and are not considered a threat to the dam's safety. Recommend continued surveillance of this area, particularly during periods of high pool.

2-06. SPILLWAY.

a. Weir. Considerable surface deterioration of concrete including cracking and spalling at the top and downstream portion of the ogee. Extensive cracking varying from hairline to ¼ inch width at top of the ogee noted. Recommend sealing of the wider cracks (larger than 1/32 inch).

b. Other.

(1) One rock fall on the left side and one on the right side downstream of weir noted. No action required.

(2) Open joints in rock on right side of spillway cut noted. These are particularly evident in the section adjacent to the stilling basin and outlet channel. No action required.

(3) A large wet area noted at the downstream end of the spillway channel almost in line with the stilling basin and outlet channel. No action required.

(4) A wet area was noted in the spillway channel upstream of the weir. No action required.

2-07. UPSTREAM RESERVOIR AREA.

1. Intakes to gaging tower are restricted by growth and sediment. Recommend cleaning out screen on the lowest intaking and cleaning out vegetation around the lower two intakes.

2-08. OTHER.

1. Settlement of fill noted around piezometer DYB-38. Recommend backfilling around piezometer to level of embankment surface.

SECTION 3
CORRECTIVE MEASURES

3-01. GENERAL. No corrective measures have been undertaken since the third periodic inspection. Jadwin Dam has been functioning satisfactorily with normal maintenance. A tunnel inspection was performed in 1978 in accordance with instructions in the third periodic inspection.

SECTION 4
INSTRUMENTATION RESULTS

4-01. GENERAL. The results of piezometer readings for the period through October 1976 were presented in the third periodic inspection report. A brief discussion of the instrumentation data for the period January 1977 to November 1980 follows:

4-02. PIEZOMETERS.

Piezometers have generally reacted to fluctuations in pool elevations or creek flows in a manner consistent with their locations in the embankment or foundation. The drop in piezometric levels evident during the summer of 1980 is in accordance with expected behavior under the drought conditions experienced during the period.

The sudden rise in DYL-15 in April 1980 is due to blockage of the standpipe and is probably the result of vandalism. Efforts to relieve this blockage have been unsuccessful. The sustained rise in DYL-12 during the period August to October 1980 is also thought to be the result of blockage based on readings obtained since October 1980. The rise in the water level at DYB-32 in the period May to July 1979 may have been due to the higher than normal creek flows in the early part of the time period in question but it is considered more likely that they are the result of mistakes made in reading or recording the levels during that time. DYB-39 has been non-functional since March 1977 and, as mentioned above, DYL-15 has not functioned properly since April of 1980.

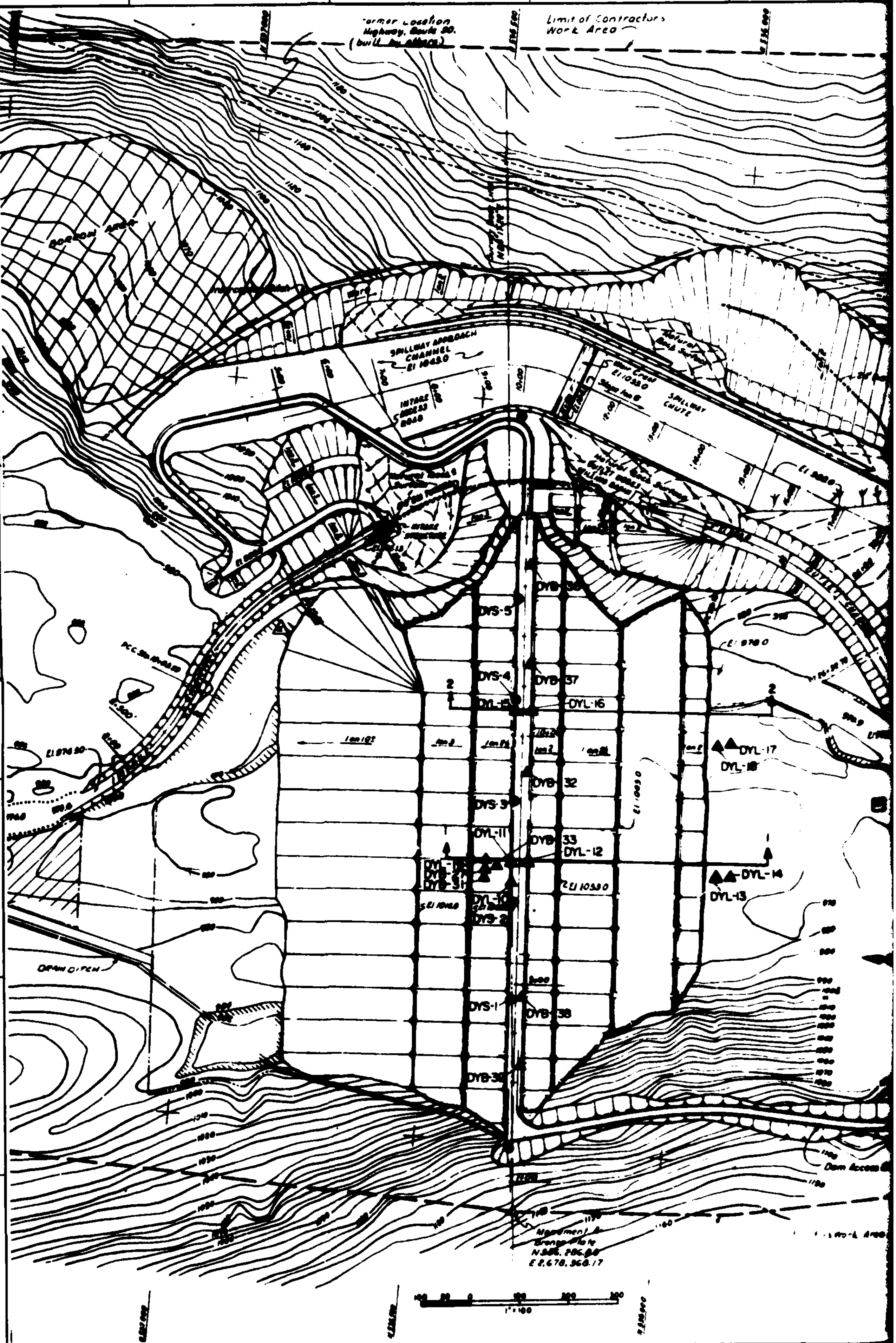
Review of piezometer data obtained prior to 1976 revealed questionable readings of piezometer DYL-19 in October and November 1974. Plate 1 has been revised to indicate the unreliability of those readings and has been included in this report for future reference.

SECTION 5
SUMMARY

No major areas of concern were noted by the inspection team in the fourth periodic inspection. The instrumentation installed to date and currently operational is adequate to measure performance of the dam, particularly with respect to the short term storage capability incorporated into this project. However, it is extremely important that piezometeric and visual data, e.g. downstream seepages, be obtained during periods of high water. To accomplish this the District's F&M Branch should be notified when high pools are anticipated to allow a representative to be dispatched to assist the dam tender in collecting data.

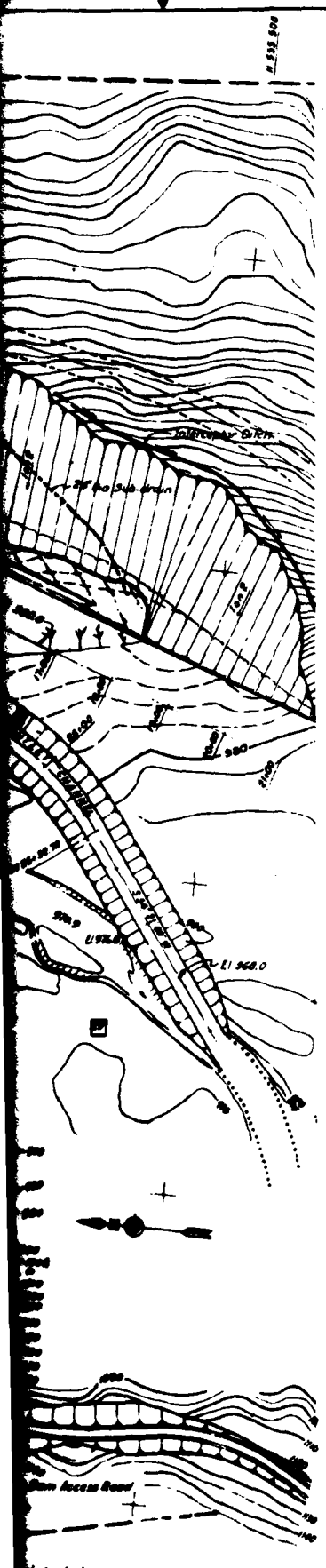
The overall condition of the project is considered good. Remedial measures, as considered necessary will be accomplished as funds become available. The next recommended periodic inspection is as scheduled, July 1986.

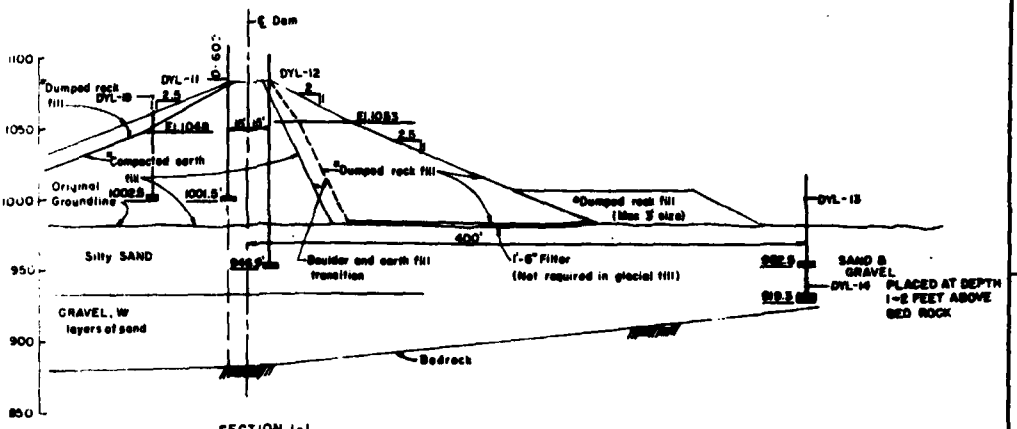
CORPS. OF ENGINEERS



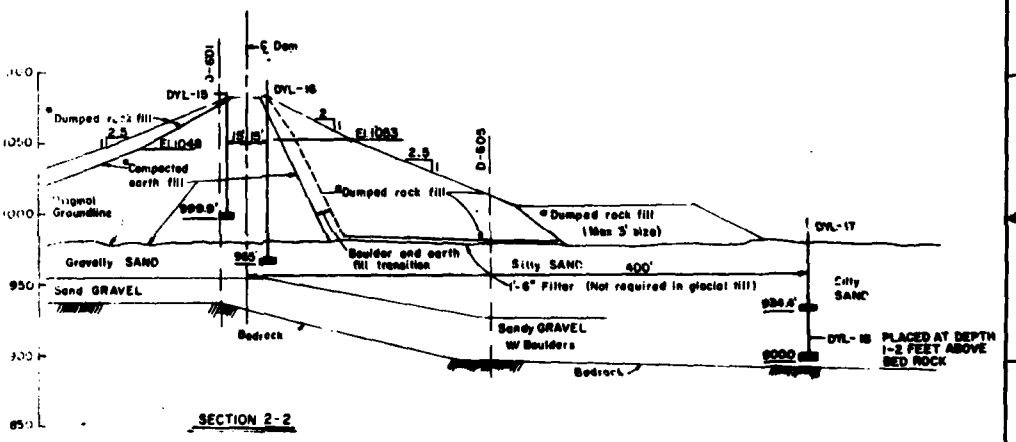
U. S. ARMY

REVISIONS			
SYM	ZONE	DESCRIPTION	DATE





SECTION 1-1

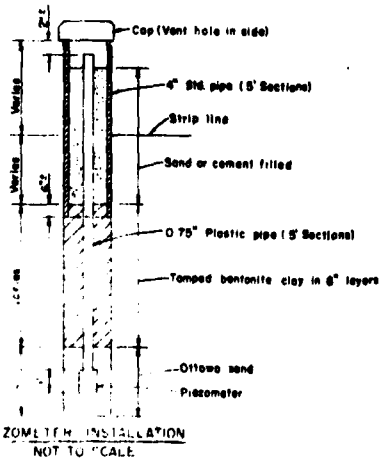


SECTION 2-2

*Boulders from hill and rock from spillway and tunnel excavation.
*Till products - gravelly sandy silt and silty sand

LEGEND

1000	Proposed Piezometer at elevation.
D-605	Bore hole
PZ-1-1 ▲	Location of Casagrande type Piezometers.
DYS-1 ⊗	Settlement pipes
●	Survey Monuments



PIEZOMETER INSTALLATION
NOT TO SCALE

SCALE IN FEET
50 0 50 100

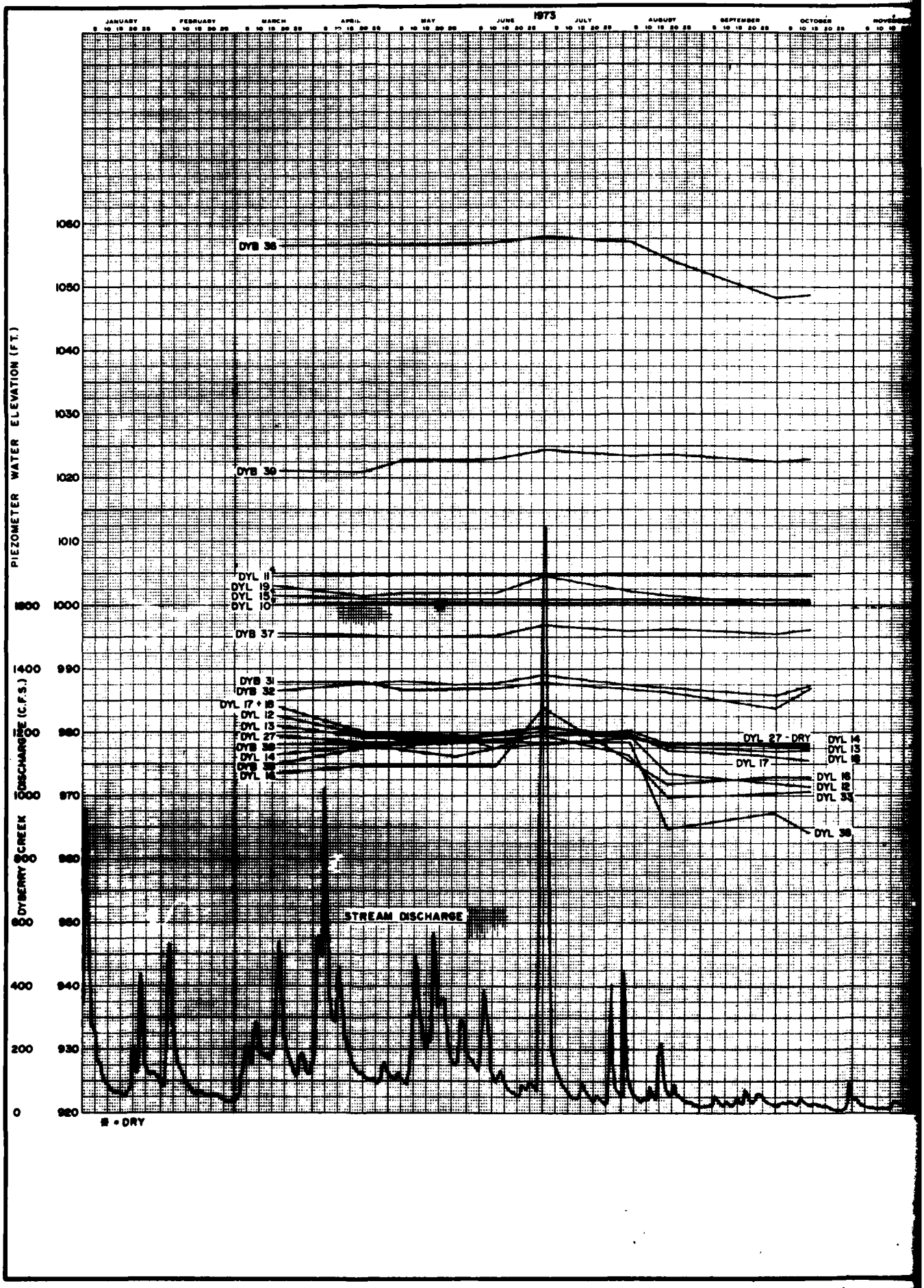
LACKAWAXEN RIVER BASIN
JADWIN DAM
DYBERRY CREEK, PENNSYLVANIA

INSTRUMENTATION PLAN

ALL OPERATIONS PERFORMED IN ACCOMPLISHING THIS WORK MUST BE DONE IN ACCORDANCE WITH ALL APPLICABLE SAFETY REQUIREMENTS

PLATE 1

CORPS OF ENGINEERS



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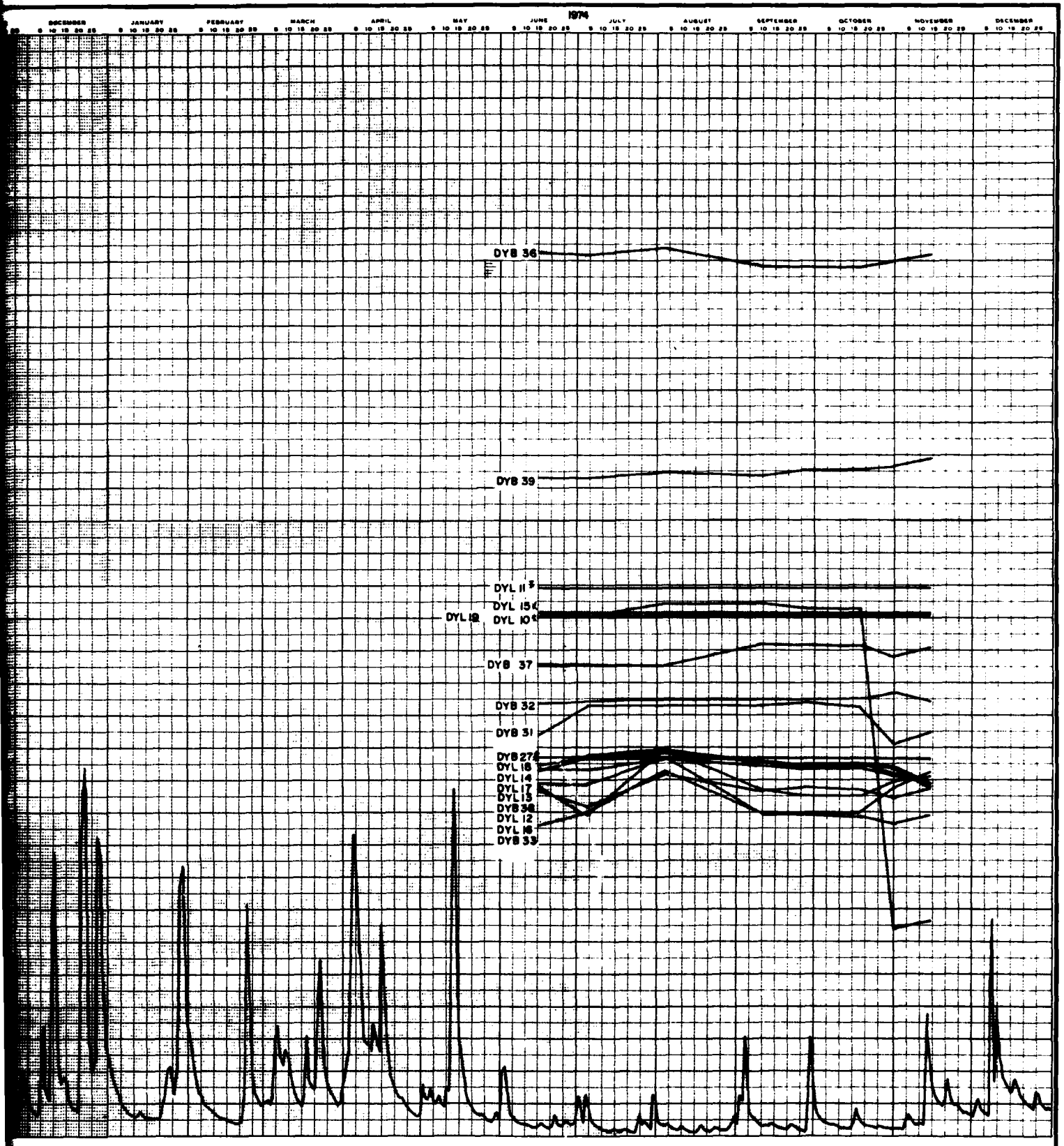
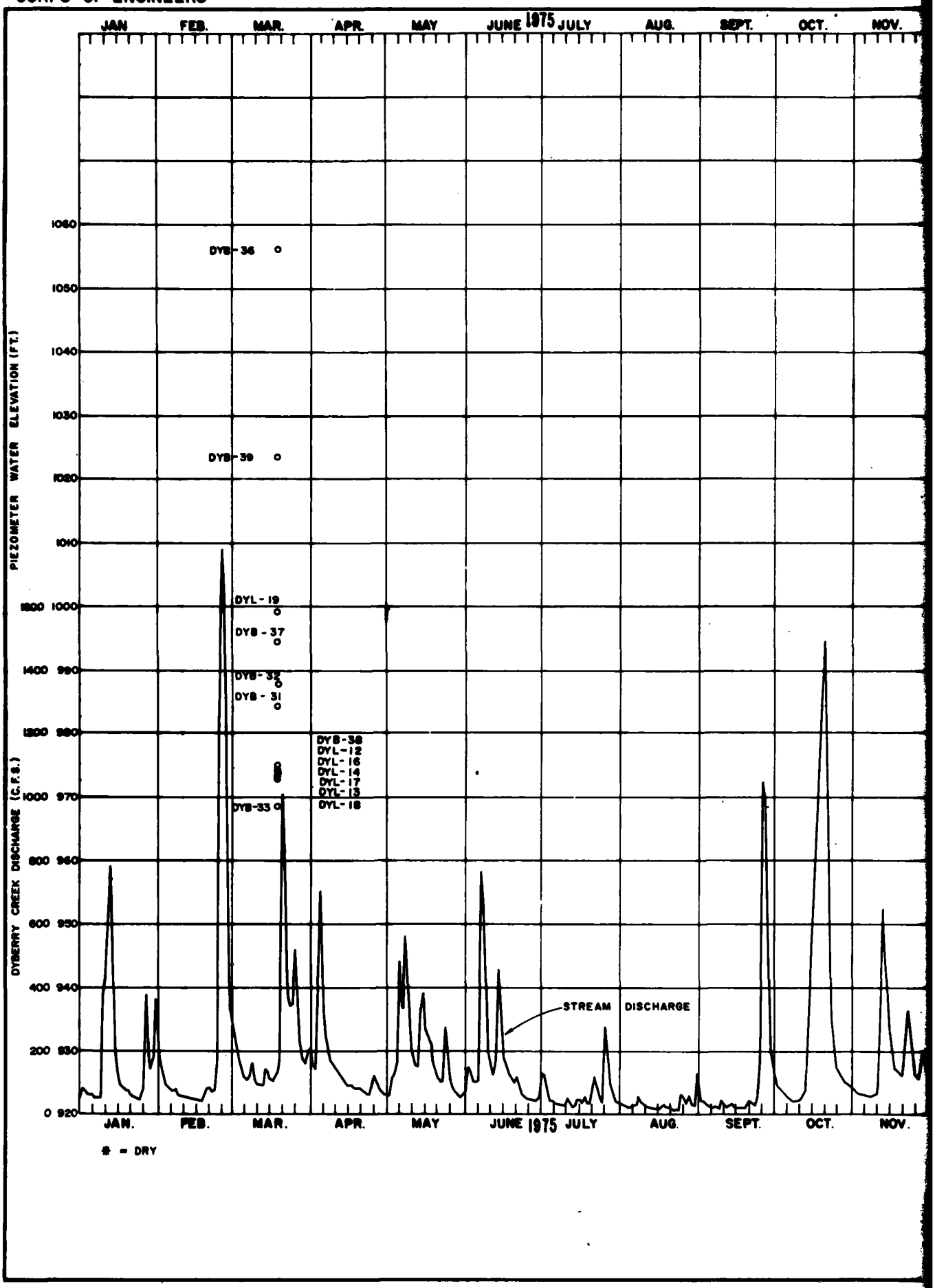


LACKAWAXEN RIVER BASIN
JADWIN DAM
DYBERRY CREEK, PENNSYLVANIA

PIEZOMETER DATA
1973 - 1974

PLATE 2

CORPS OF ENGINEERS



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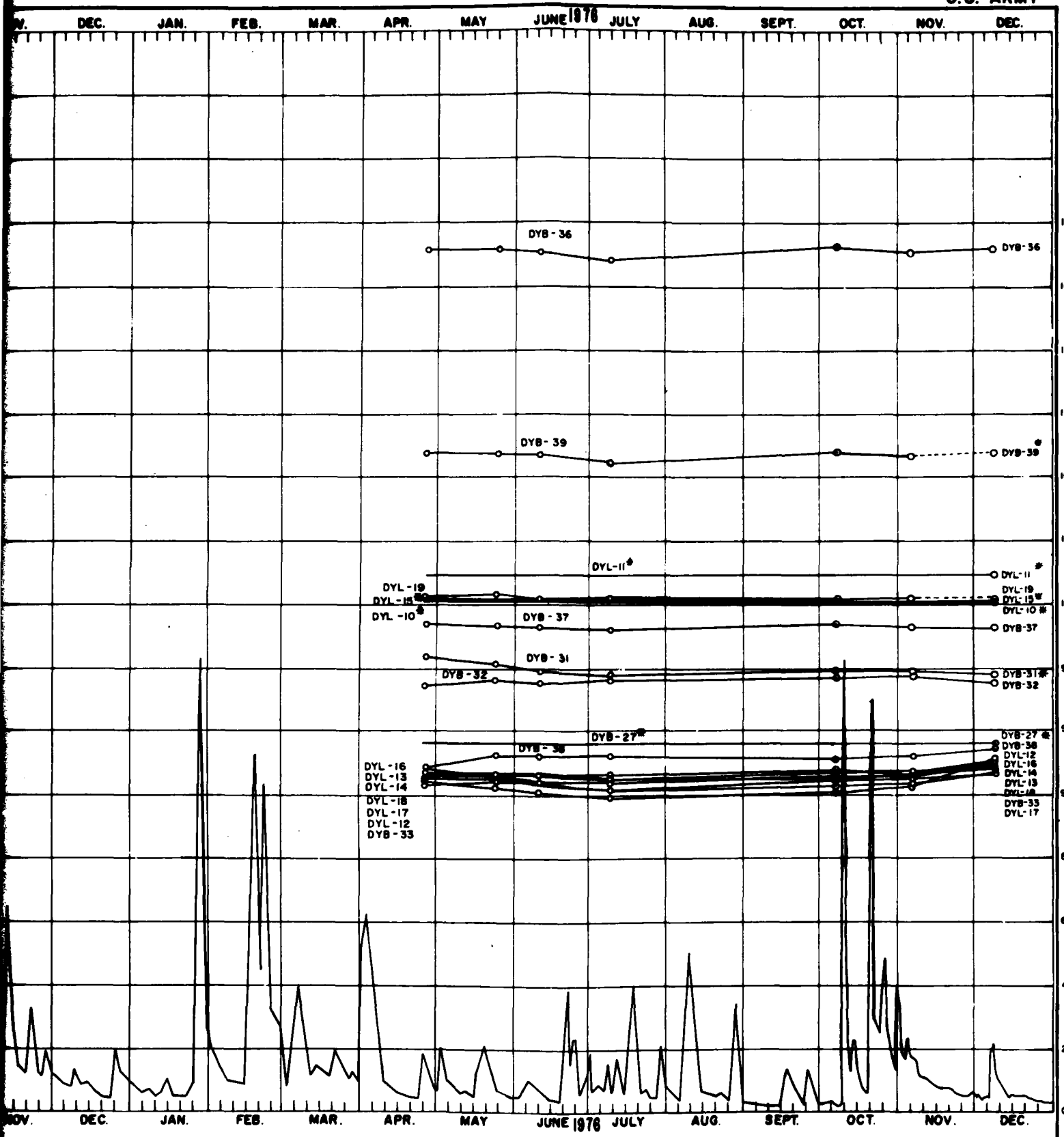
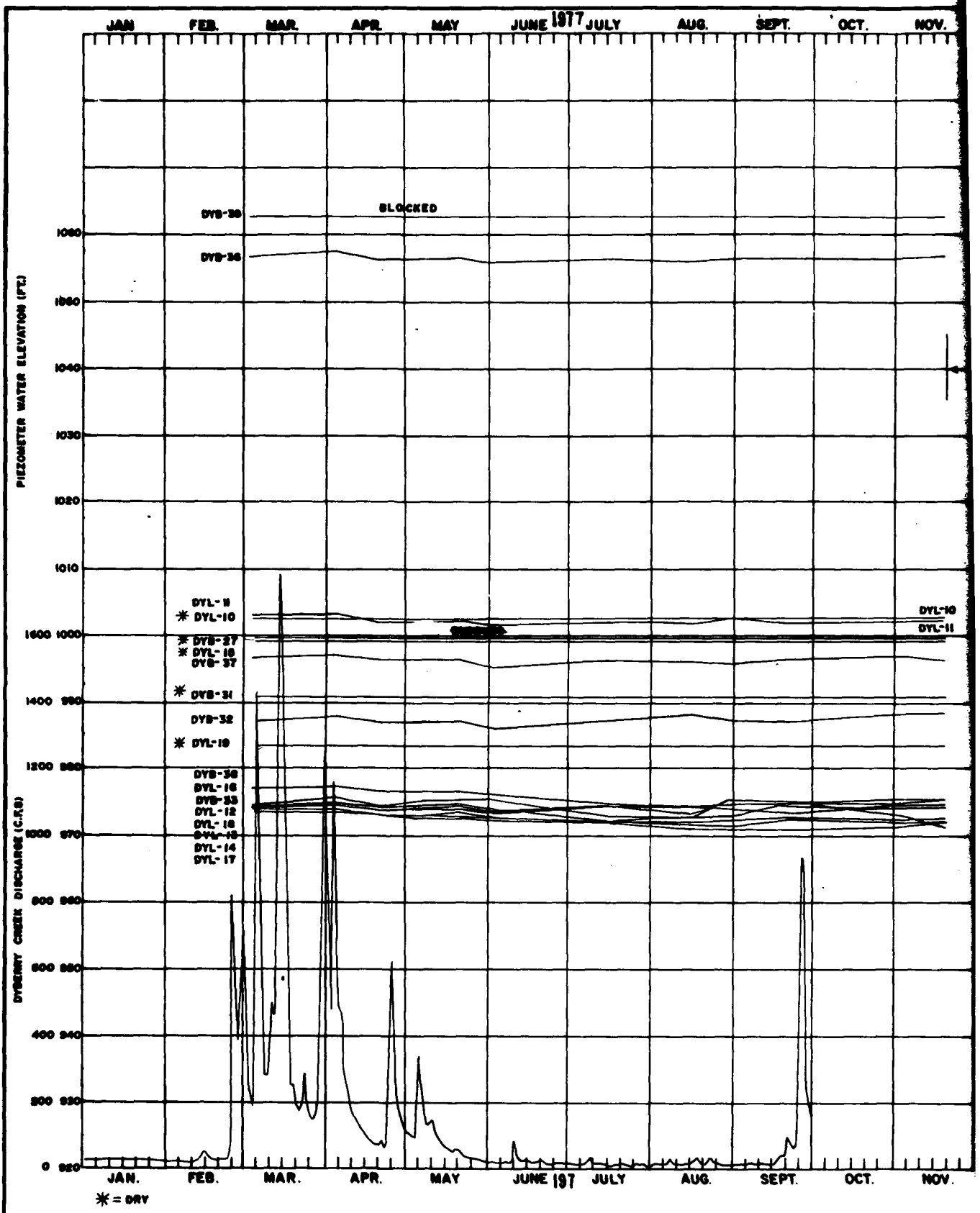


LACKAWAXEN RIVER BASIN
JADWIN DAM
DYBERRY CREEK, PENNSYLVANIA

PIEZOMETER DATA
1975-1976

PLATE 3

CORPS OF ENGINEERS



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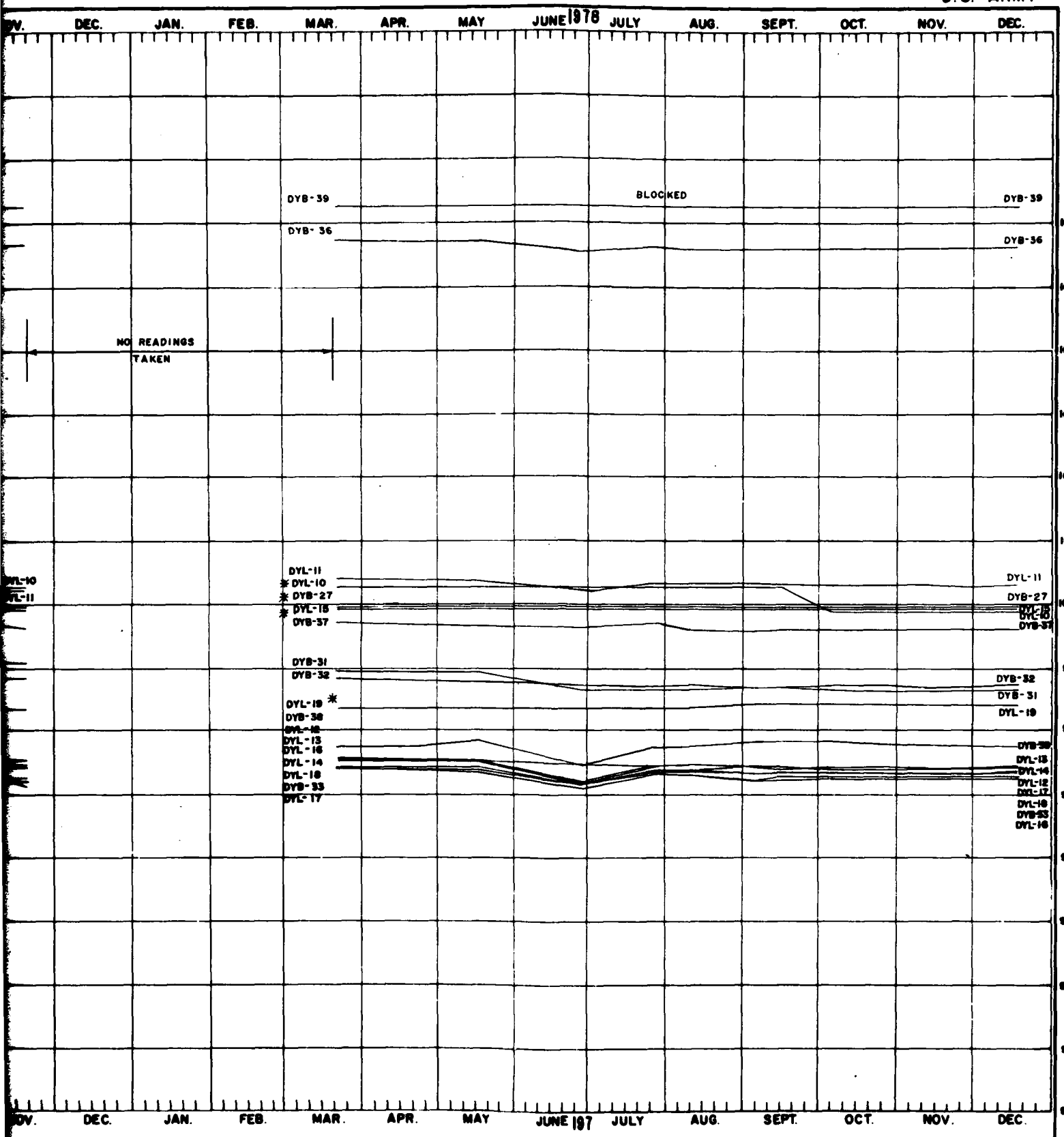
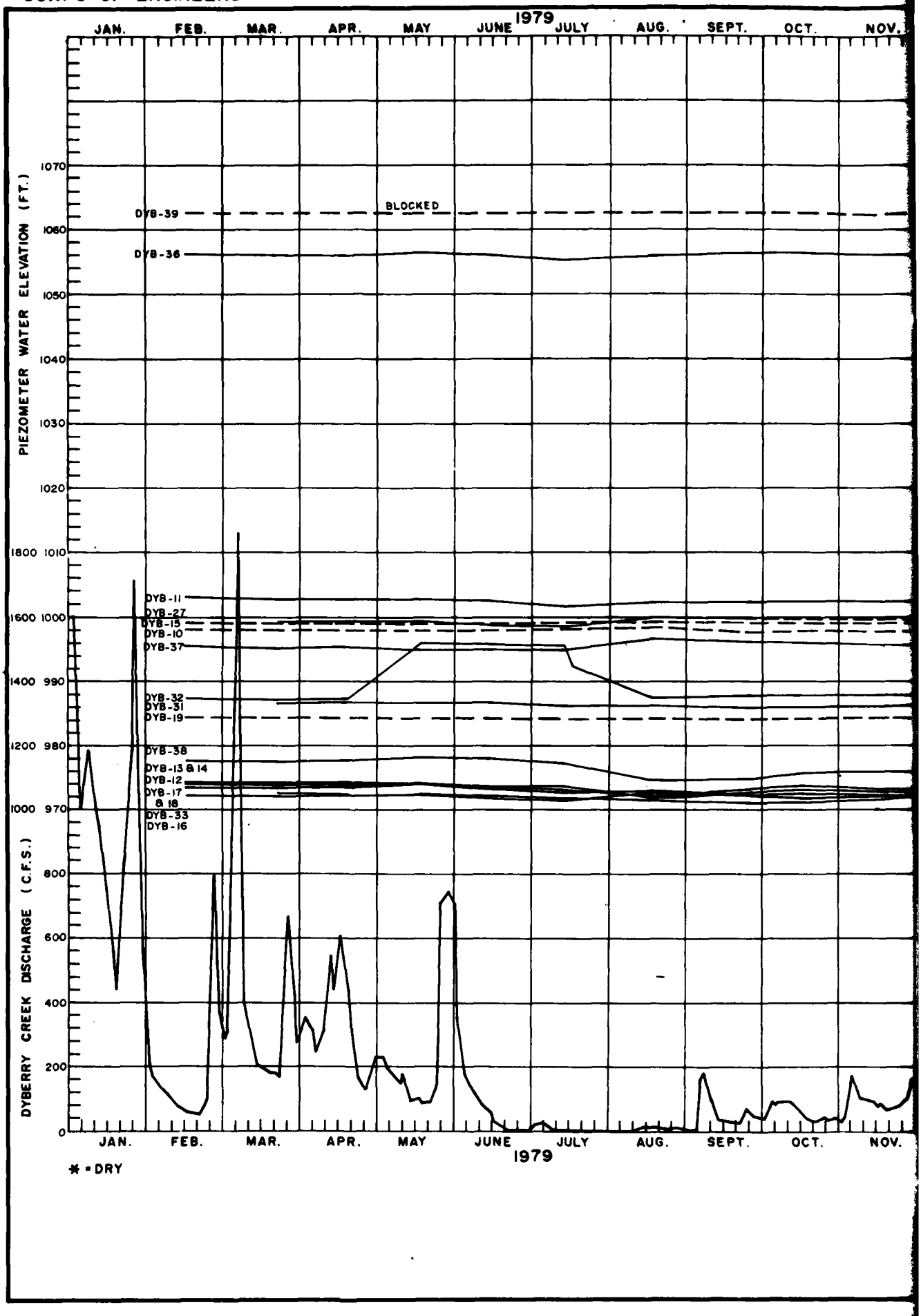


LACKAWAXEN RIVER BASIN
JADWIN DAM
DYBERRY CREEK, PENNSYLVANIA

PIEZOMETER DATA
1977 - 1978

CORPS OF ENGINEERS



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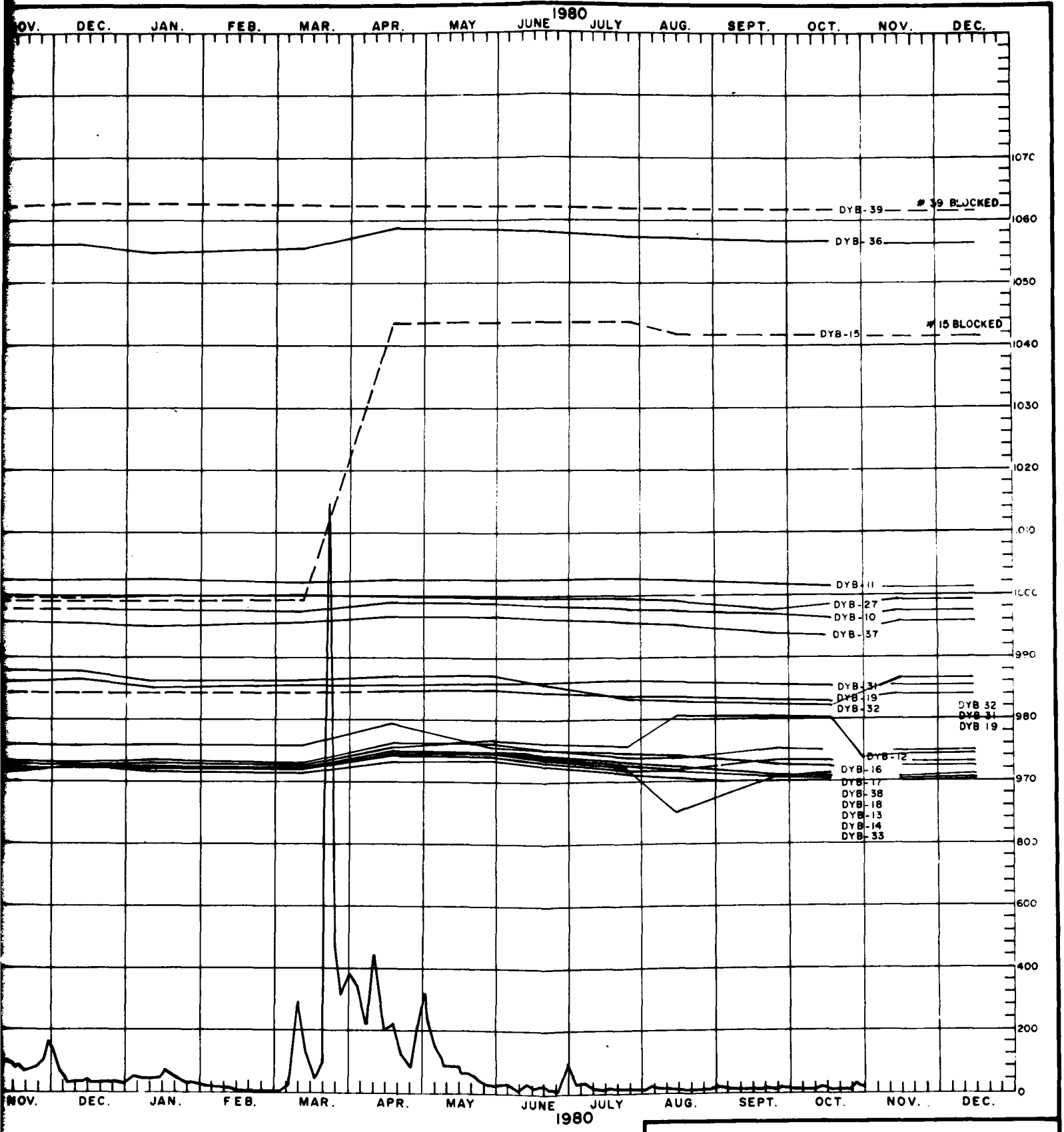

LACKAWAXEN RIVER BASIN
JADWIN DAM
DYBERRY CREEK, PENNSYLVANIA

PIEZOMETER DATA
1979 - 1980

1 2

PLATE 5

APPENDIX A

CONDITION REPORT
JADWIN DRY DAM
DYBERRY CREEK, PENNSYLVANIA

PERIODIC INSPECTION REPORT NO. 4

LIST OF ATTENDEES

JADWIN DRY DAM

List of Attendees - Periodic Inspection No. 4

F. Coppinger	- NAD, Engineering Division
J. Anastos	- NAD, Engineering Division
S. Slomoqitz	- NAD, Engineering Division
J. Torres	- NAD, Engineering Division
B. Uibel	- NAP, Engineering Division
H. Rubright	- NAP, Engineering Division
H. McDonald	- NAP, Engineering Division
R. Pinciotti	- NAP, Engineering Division
R. Smith	- NAP, Northern Area Office
L. Burdyn	- Dam Tender
J. Klosky	- Assistant Dam Tender

APPENDIX B

CONDITION REPORT
JADWIN DAM
DYBERRY CREEK, PENNSYLVANIA

PERIODIC INSPECTION REPORT NO. 4

PHOTOGRAPHS

Photo No. 1. Looking across dam crest from right abutment.

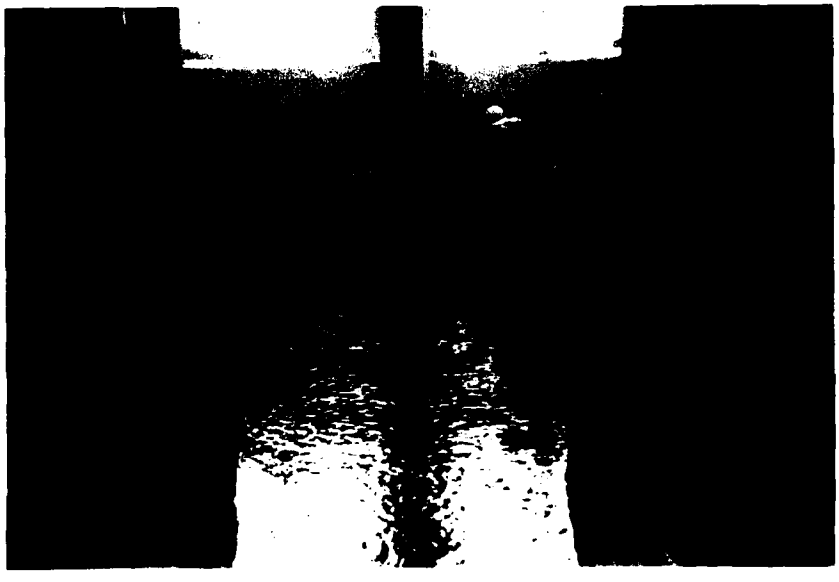

Photo No. 2. View looking upstream at stoplogs in place.

Photo No. 3. Leakage past stoplogs with stream level approximately 2 ft. above intake invert.

Photo No. 4. Crack in top of transition section of intake structure.

Photo No. 5. Spall in tunnel near Sta. 16+95.

Photo No. 6. Spall in tunnel - vicinity of Sta. 16+95.

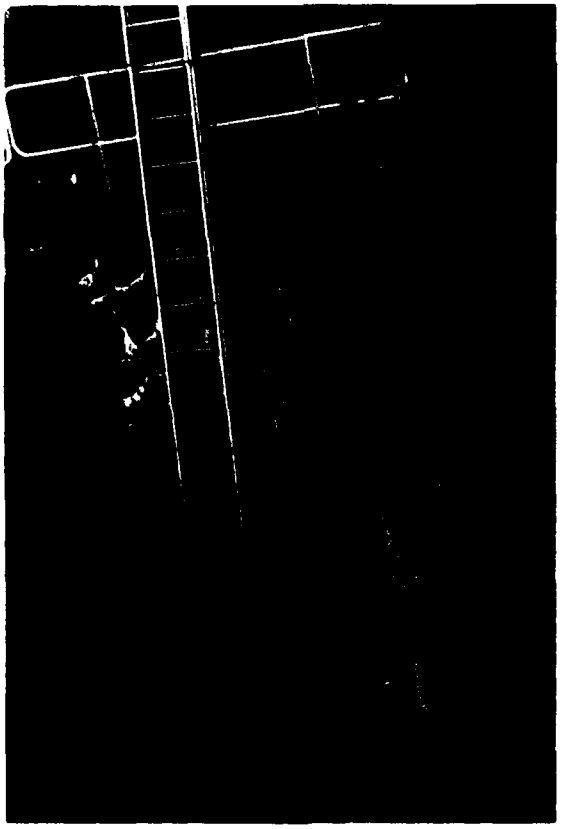

Photo No. 7. Crazing cracks in stilling basin headwall.

Photo No. 8. Spillway weir and left side rock face.

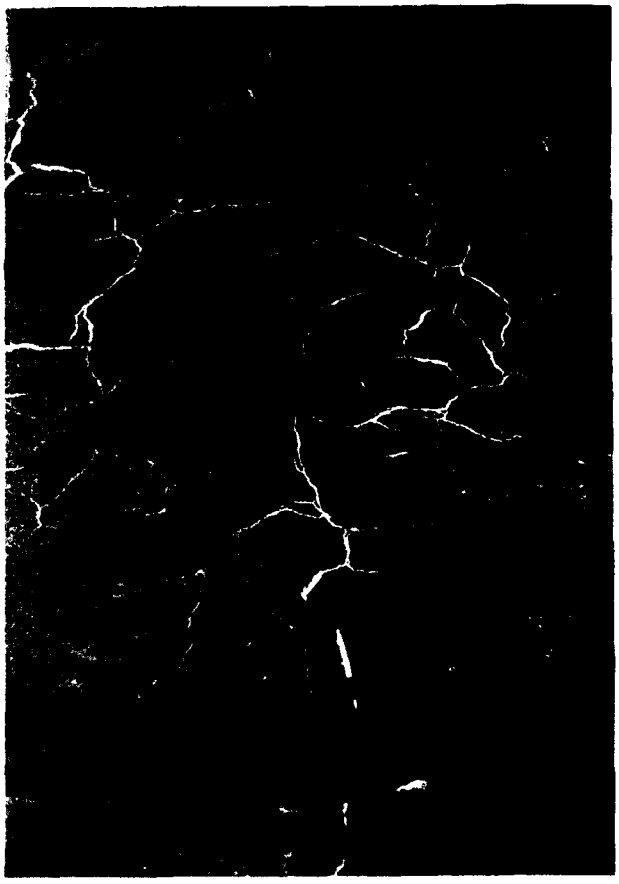

Photo No. 9. Cracking in top of ogee weir.

Photo No. 10. Spalling of concrete surface - downstream side of ogee weir.

Photo No. 11. Right side of spillway cut, concrete ogee weir in right background.

Photo No. 12. Rockfill and open joints in right side of spillway near stilling basin.

Photo No. 13. Hole in rockfill area downstream of the downstream toe of the embankment area - 8½"x15" clipboard for scale.

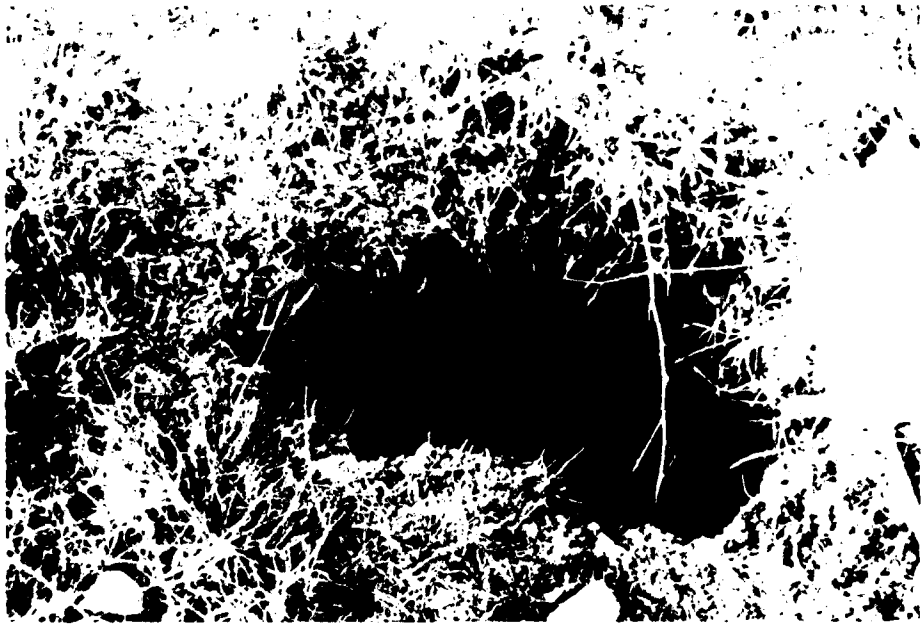

Photo No. 14. Hole in rockfill area downstream of embankment 12"(±) long clipboard at right.

APPENDIX C

CONDITION REPORT
JADWIN DAM
DYBERRY CREEK, PENNSYLVANIA

PERIODIC INSPECTION REPORT NO. 4

NADEN-TF Letter Report, Subject: Jadwin Dam - Periodic Inspection No. 4, dated 17 December 1980.

DISPOSITION FORM

For use of this form, see AR 340-15, the proponent agency is TAGCEN.

REFERENCE OR OFFICE SYMBOL	SUBJECT
NADEN-TF	Jadwin Dam - Periodic Inspection No. 4

TO	FROM	DATE	CMT 1
Memo for the Records	Juana Torres	17 December 1980	

1. Inspection Date: 13 November 1980.

2. This is a dry dam.

3. Weather: Sunny and mild.

4. The following items were noted by the NAD personnel. Recommendations, where appropriate, are included.

a. Instrumentation Data:

1. Some settlement was observed around piezometer DYb Appropriate action should be taken.

2. District will read the surface settlement pipes, at the crest of the dam, during the Spring of 1981.

b. Intake Structure:

1. Condition of concrete was noted as "unchanged" from last periodic inspection.

2. Some minor leakage around stop logs was noted.

c. It is suggested that District consider a possible change in procedure for raising and lowering the gates:

In lieu of hiring a crane and an operator to lower or raise the gates, provide a frame and hail(s) over the upper walkway to attach hand-operated or portable-power-operated hoists to raise or lower the gates. It thus may be possible to accomplish this operation with one man in lieu of three men and a crane, effecting a saving in operating costs.

d. <u>Conduit</u>

1. The conduit was inspected by NAP personnel only due to high water and limited supply of hip boots.

2. The following was noted:

a. No significant change in condition from last inspection.

b. Some spalls may be a little deeper than noted in 1978 inspections e.g. in vicinity of Sta. 16+95 and transition section (spalling generally occurs at intersection of vertical and horizontal construction joint).

e. Stilling Basin

1. Some "crazing" was noted on concrete surfaces.

2. Concrete cracks were noted on side walls and wing walls on left side. Sealing is advisable.

3. Considerable siltation was observed at the upper end of the stilling basin. This area should be cleaned.

f. Embankment:

1. Seepage was noted at the upstream toe approximately 40 ft. from the right abutment due to surface and ground water. No action required.

2. Several sink holes were noted at the old river channel approximately 150 ft. from the downstream seepage berm. Another sink hole was observed at the toe of the downstream seepage berm. to the right of the old stream channel.

g. Spillway

1. Weir

a. Surface weathering e.g. spalling, crazing, cracking and some efforescence was noted.

b. Joint materials are extruded and in need of replacement.

c. The second monolith from the left (looking downstream) has experienced more substantial cracks in the crest which should be sealed as they will lead to substantial spalling of the crest (cracks generally run in a pattern which parallels the long axis of the weir).

2. Rocks slides were noted at left and right side of spillway. No action required.

3. The open condition on the rocks joints is not worse than in previous inspections.

h. Downstream Area:

Wet area, due to poor drainage, was noted downstream of the spillway channel. This area is almost parallel with the open rock joints in the abutment and spillway.

i. Upstream Area:

Minor pond area was noted at the upstream spillway channel.

j. Recommendation - It is recommended that the District's Engineering Division - Geotechnical staff-visually monitor this structure during periods of high water. Special attention should be directed to the sink holes in the old river channel and other areas, and to the wet area at the downstream end of the spillway.

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LME